

## WHERE THE SAGUARO IS KING

Review of:

John Alcock 1985. *Sonoran Desert Spring*. Chicago: Univ. Chicago Press 194 pp.

John Alcock 1990. *Sonoran Desert Summer*. Tucson: Univ. Arizona Press 187 pp.

John Alcock 2009. *When the Rains Come: A Naturalist's Year in the Sonoran Desert*. Tucson: Univ. Arizona Press 334 pp.

[41st in a series on "naturalist-in" books; see [www.ckstarr.net/reviews\\_of\\_naturalist.htm](http://www.ckstarr.net/reviews_of_naturalist.htm)]

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The Sonoran Desert covers part of northwestern Mexico and about the southern half of the state of Arizona. Average annual rainfall is only about 15 cm, with large variation among years. Direct data, available for about the last century, can be supplemented by tree rings (thicker during wetter years) that go back some thousands of years. These show that "average" years are in the minority. Accordingly, a key sub-theme of these books, as in Adolph Murie's *A Naturalist in Alaska* (see review no. 37) is the advantages of observation over many years.

Precipitation is mainly in December-March as gentle rain and again in July-August as violent thunderstorms, the monsoon. In between, the desert can go for months without rain. Clouds may gather, it looks like rain is on the way, and then the clouds go away and the landscape stays dry for days or weeks more. As in any desert, then, drought is the outstanding challenge for plants, and in any very long stretch without rain, many of them will die. Animals have the option of taking shelter from the sun, but they risk starvation if the plants are forced to cut back.

Climatic changes affect people, as well as wild plants and animals, and some extended dry periods can be correlated with native peoples moving away. Even so, the disappearance of at least one major aboriginal culture from the area remains unexplained.

John Alcock's is an entomologist whose main research is on behavioural ecology, especially the nesting biology and reproductive strategies of solitary wasps and bees. He has lived near the northern edge of the Sonoran Desert for more than 30 years and spends a great deal of time in the field. The focus is the Utery Mountains in Arizona's Tonto National Forest, a "perfectly ordinary, but utterly wonderful, collection of hills". He has taken hundreds of walks up Utery Peak (about 890 m). In GoogleEarth if you put the cursor on 33°30'34"N and 111°36'14"W, I believe it will be over Utery Peak.

About 40 years ago, one of his former students told me that "John Alcock thinks about natural selection all the time", a remark that has shaped my image of what a real naturalist should be like. This persistent focus is very much in evidence in these books. Alcock will describe a (usually behavioural) phenomenon and then ask how it could possibly be maintained by the action of selection. Why does the teddy-bear cholla cactus reproduce mostly asexually, unlike other cacti in the area? Why do male

*Xylocopa varipuncta* carpenter bees form leks? Why does the zone-tailed hawk mimic the turkey vulture in both its plumage and manner of flying? Why do Harris's hawks hunt cooperatively, while other hawks do not? Why do rattlesnakes rattle? It is certainly not to protect humans and other animals, so has rattling perhaps evolved in the context of encounters with coyotes and roadrunners? Why do blister beetles mate for several hours, when a male could mate in a minute and then go in search of other females? Why do collared peccary (quenk) females feed the young of other females? Similarly, why do some Harris's hawks assist in rearing others' offspring instead of nesting on their own? Since large males of the digger bee *Centris pallida* have a distinct mating advantage, why does substantial size variation persist in the population? Why does the horned lizard, specialized to eat harvester ants and able to withstand their stings, eat only a few from a bountiful colony at one sitting? Why does the phainopepla bird breed in colonies, rather than in isolated pairs? And why is the male phainopepla, exposed as it is to the blazing desert sun, black? Why do some birds produce camouflaged eggs, while others do not? Why does the well camouflaged zebra-tailed lizard conspicuously wave its tail when approached by a human? Why do female greater earless lizards show a distinct preference for males with especially bright spots?

In discussing some such questions, Alcock examines and discards one hypothesis after another, finally to end up either with one that satisfies or the conviction that we simply don't know.

The statuesque saguaro cactus, *Carnegiea gigantea*, is the emblematic plant of the Sonoran Desert. Saguaros are very good at taking up and storing water as it comes available, sometimes up to 200 gallons. They develop very slowly and may not reproduce before the age of 50, at which time they may already weigh several tons and have more than a century of life still to go. Their ripening fruits bring a time of abundance for several animals that feed on the pulp and seeds.

The vegetation is not dense in this rocky, sandy landscape, so that large plants seem more like individuals, rather than parts of a continuous vegetation. Alcock knows some of the saguaros personally. He has been acquainted with them for many years and has watched their development and vicissitudes. Mature individuals tend to be top heavy, which, along with their shallow root systems, make them vulnerable to toppling in a strong storm. And when one falls, it represents a rich source of decaying nutrients for bacteria and insect larvae, rather like the carcass of a whale. After one large specimen fell in a storm and lay dead on the ground, Alcock monitored it over the next 14 years, describing the stages of its dissolution.

He is similarly personally acquainted with many individual paloverdes (*Cercidium* spp.), large shrubs and small trees with green, photosynthesizing bark, hence the name.

These books are organized by months, the first March to June, the second May through September, and the third (independent of the other two) from January through December. Each chapter is around a well-defined theme, usually a particular species. Some titles reveal the subject right away, while in others Alcock seems to delight in misleading. "Two Ravens" says nothing about ravens or any other bird until

the very end. Recall that William Beebe (see review no. 13) was also fond of this kind of switcheroo.

Some chapters are only about a page long, often setting a scene by mentioning things observed on a particular walk. For example, in "Hawk Morning", Alcock hears creosote grasshoppers and sees first a scampering ground squirrel and then a hunting red-tailed hawk suspended in the air, hears the yowling of a coyote, a robber fly buzzes from one shrub to another, while first two kestrels and then two Cooper's hawks fly past. These are hard-core naturalist-in notes.

*Sonoran Desert Spring* and *Sonoran Desert Summer* are each illustrated with several attractive drawings, while *When the Rains Come* is richly illustrated with photos, mostly of landscapes and large plants. An especially striking pair of photos shows a broad landscape in one February after a long drought and again in another February after a much wetter winter.

An annoying minor feature is the persistent use of the old measures (feet, acres, quarts, degrees Fahrenheit), as if only Americans will read them. Why the pessimism?

"Hill-topping", a distinctive behaviour of some solitary wasps, flies and butterflies, has been one of Alcock's research foci. A male takes exclusive possession of the top of a particular paloverde tree or other prominence on a ridge, flying out to challenge other males that intrude in his space. This can lead to flying contests between males, somewhat like the head-cutting contents of rams, except that strength is shown by the two flying around each other. Alcock relates how he discovered hill-topping by tarantula-hawks (solitary wasps) and his subsequent long-term studies. These showed that a particular vantage point can be utilized year after year by succeeding generations.

Not all species have the same hill-topping period, so that a given spot may be utilized by several individuals in succession throughout the day. Why is a particular period preferred by a given species? The obvious answer is that it is when females are most likely to come, but why do females come at that time and not another? And there he goes again, compulsively raising and discarding hypotheses. Go for it.

When a prolonged drought ends, the naturalist is eager to get out and see what is happening. The first rains of spring can have a wonderfully stimulating effect on the biota, not just in renewed plant growth but in such things as the mating flights of ants and termites. Alcock ends *When the Rains Come* on a note of great expectation: "When the next rain does come, I will take this as an excuse to come here again to find out how the plants and animals are responding to their food fortune, each visit to this mountain increasing my understanding and appreciation of an always changing but most excellent place."

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